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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,893	04/16/2004	Zohar Yakhini	10020708-1	8979

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EXAMINER	
NEGIN, RUSSELL SCOTT	

ART UNIT	PAPER NUMBER
1631	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/825,893	YAKHINI ET AL.	
	Examiner	Art Unit	
	RUSSELL S. NEGIN	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/5/07; 6/25/07*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12 and 14-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12 and 14-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Comments

Applicants' amendments and request for reconsideration in the communications filed on 5 October 2007 and 25 June 2007 are acknowledged and the amendments are entered.

Claims 1-12 and 14-28 are pending and examined in the instant application.

Withdrawn Rejections

The rejections of claims 1, 2, 4, 7-8, 10-12, 14, 15, 17, and 28 under 35 U.S.C. 103(a) as being unpatentable over Larson et al. [Calculus with Analytic Geometry, 1990, D. C. Heath and Company; Lexington, Massachusetts; Section 14.1, pages 785-795] in view of Schadt et al. [Journal of Cellular Biochemistry Supplement 37: 120-125, 2001] are withdrawn in view of applicant's arguments regarding the combination of references.

The rejections of claims 20-21, 23 and 26-27 under 35 U.S.C. 103(a) as being unpatentable over Larson et al. in view of Schadt et al. as applied to claims 1-2, 4, 7-8, 10-12, 14-15, 17, and 28 above in view of Chalmers: [http://web.archive.org/web/20021008184825/http://www.s2.chalmers.se/~agrell/hypercubes (Accessed on August 28, 2006; website last updated in 2002)] are withdrawn in view of applicant's arguments regarding the combination of references.

Claim Rejections - 35 USC § 101

The following rejection is newly applied:

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-12 and 14-28 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The following analysis of facts of this particular patent application follows the analysis suggested in the "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility". Note that the text of the Guidelines is italicized.

To satisfy section 101 requirements, the claim must be for a practical application of the § 101 judicial exception, which can be identified in various ways (Guidelines, p. 19):

- The claimed invention "transforms" an article or physical object to a different state or thing.
- The claimed invention otherwise produces a useful, concrete and tangible result.

In the instant case, the claimed invention does not "transform" an article or physical object to a different state or thing because the claimed invention is a method for selecting a set of normalizing data points. This does not preclude the subject matter to be patentable as, for eligibility analysis, as

physical transformation "is not an invariable requirement, but merely one example of how a mathematical algorithm [or law of nature] may bring about a useful application." AT&T, 172 F.3d at 1358-59, 50 USPQ2d at 1452. If the examiner determines that the claim does not entail the transformation of an article, then the

examiner shall review the claim to determine if the claim provides a practical application that produces a useful, tangible and concrete result. In determining whether the claim is for a "practical application," the focus is not on whether the steps taken to achieve a particular result are useful, tangible and concrete, but rather that the final result achieved by the claimed invention is "useful, tangible and concrete." The claim must be examined to see if it includes anything more than a § 101 judicial exception. If the claim is directed to a practical application of the § 101 judicial exception producing a result tied to the physical world that does not preempt the judicial exception, then the claim meets the statutory requirement of 35 U.S.C. § 101. If the examiner does not find such a practical application, the examiner has determined that the claim is nonstatutory. (Guidelines, p. 20)

The question is thus whether the final result achieved by the claimed invention satisfies all three criteria of being useful, and concrete, and tangible.

Furthermore, the useful, tangible, and concrete result must be recited in the claim itself, rather than addressed in specification.

The instant claims are drawn to computational means for selecting a set of normalizing data points. However, as claimed, the method does not produce a tangible result. For example, the method as claimed may take place entirely within the confines of a computer or a human mind without any communication to the outside world and without using or making available for use, the results of the computation. In this instance, it is possible that the memory is only accessible by other computer memories, in which case the resultant data would not be accessible to a user. Thus, the instant methods of the claims do not produce any tangible result.

Likewise, while claims 14-19 recite a SYSTEM for selecting a set of normalizing data points, and the processor and memory are tangible, the computer instructions execute a method that does not necessarily produce a tangible result (i.e. storing data

of the selected normalizing points in a computer memory may be only accessible by other computer memories and not necessarily a user.).

Additionally claims 12 and 28 are drawn to computer instructions stored on a computer readable medium used to implement the methods described above. Since computer readable media are not defined in the specification, they are interpreted to encompass carrier waves, which are per se, not statutory.

Claim Rejections - 35 USC § 103

The following rejection is newly applied:

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 4, 7, 12, 14, 17, 20, 23, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Larson et al. [Calculus with Analytic Geometry, 1990, D. C. Heath and Company; Lexington, Massachusetts; Section 14.1, pages 27-33, 785-795, and page 840].

Claim 1 is drawn to a method for selecting a set of normalizing data points from n data sets, when n is at least 3, containing data points having values and identities, the method comprising:

--receiving n data sets;

--considering the data points to be distributed in an n-dimensional data point space;

--determining one or more order-preserving sequences of data points within the n-dimensional data point space;

--selecting, as normalizing data points, data points from the one or more order-preserving sequences; and

--storing the selected normalizing points in a computer memory as a basis for subsequence normalization of the n data sets.

Claim 7 is further limiting wherein considering the data points to be distributed in an n-dimensional data point space further includes, for each data point, considering the data point to have a value in each on n-dimensions, the value of a data point in an i-th dimension equal to the value of the data point in an i-th data set.

Claim 12 is further limiting wherein the method is in the form of computer instructions on computer readable media.

Claim 14 is drawn to the same subject matter as instant claim 1 except that it is a system on a computer.

The section of Larson et al., entitled, "Solid analytic geometry and vectors in space," describes all of the steps if the instant method except for the use of computer memory.

In this instance, there are three dimensions, and points are distributed in three-dimensional space (see the Figures 14.1 through 14.7 on pages 785-787 of Larson et al).

Terms of interest are defined in the instant specification, on page 17, lines 11-16, and they are reiterated here for convenience:

> An order-preserving sequence us a sequence of data points in which the value of the data points within the sequence uniformly increase within the sequence. When a sequence is defined as an ordered subset of points with a data set, then a longest-order-preserving sequence ('LOPS') is the maximally sized, one or more ordered subsets of points selected from the data set that are ordered by signal strength or by some other associated value, parameter, or characteristic. A heaviest-order- preserving sequence ('HOPS') is the order preserving sequence with greatest sums of weights associated with data points in order-preserving sequence.

Consequently, when applied to three-dimensions, the method of finding order-preserving sequences of data points in the instant application (i.e. Figure 11B) involves iteration(s) of determining traces of points in the same octant as the point before it with each subsequent point determining its own coordinate system.

Now, when taking into account limitations of instant claim 1 in combination with the rectangular solid (i.e. Figures 14.1 and 14.6); a rectangular solid in the first octant

has 8 data points with the following identifiers → (0, 0, 0), (1, 0, 0), (0, 1, 0), (0, 0, 1), (1, 1, 0), (1, 0, 1), (0, 1, 1), and (1, 1, 1). Consequently, these coordinates are in three dimensional space and they encompass three data sets: X coordinates [0, 1, 0, 0, 1, 1, 0, 1], Y coordinates [0, 0, 1, 0, 1, 0, 1, 1], and Z coordinates [0, 0, 0, 1, 0, 1, 1, 1]. Consequently, the Figures of Larson illustrate three data sets in three dimensional space.

Now, the next step of determining one or more order preserving sequence in 3-dimensional space is illustrated in Figure 14.6 on page 787 of Larson et al., wherein it is shown that a unit vector from [0, 0, 0] to [1, 1, 1] preserves the increasing order of each data set (x coordinates, y coordinates and z coordinates). Consequently, Figure 14.6 also illustrates selection of the sequence of points [0, 0, 0] and [1, 1, 1].

This section of Larson et al., however, does not show storage of data on a computer memory.

However, page 840 in Larson et al. illustrates storage of 3 dimensional graphic data on a computer system in order to generate graphics.

Claims 4 and 17 are further limiting wherein the one or more order-preserving sequences of data points is a longest order preserving sequence of data points having a shortest Euclidean distance accumulated along a both from an initial data point of the order-preserving sequence to a final data point of the order preserving sequence.

Figure 14.6 on page 787 of Larson et al. illustrates the shortest Euclidean path between the order preserving sequences from [0 ,0 ,0] to [1, 1, 1] with a unit vector going directly from the starting to the ending point.

Claim 20 is drawn to the same subject matter as instant claim 1, with the exception the data points are considered in n/2 separate 2-dimensional data point spaces where n is as even number greater than or equal to 4.

Claim 23 is further limiting wherein the one or more order-preserving sequences of data points is a longest order preserving sequence of data points having a shortest Euclidean distance accumulated along a both from an initial data point of the order-preserving sequence to a final data point of the order preserving sequence.

Claim 28 is drawn to computer instructions stored in a computer readable medium that implements the method of claim 20.

The discussion of Larson et al. above teaches all of the limitations of instant claim 20 and 23 except the 2 (or more) separate two dimensional spaces. Page 30 of Larson et al. teaches two separate order preserving sequences in two separate 2 dimensional spaces with the shortest Euclidean distances drawn between the relevant points (i.e. Figure 1.41 and 1.42 of Larson et al.).

It would have been obvious to some one of ordinary skill in the art at the time of the instant invention to modify the vector geometric analysis of Larson et al. by use of the computer graphics system disclosed in Larson et al. because it is obvious to

improve a known technique with a known method. In this instance, it would have been obvious to automate the geometric algorithm by use of the computer system to result in a faster, more expeditious system for generating multi-dimensional graphics. There would have been a reasonable expectation of success to automate because the graphing and automation techniques of Larson et al. are generically applicable to illustrate the geometric principles within Larson et al.

Response to Arguments:

Applicant's arguments filed 25 June 2007 have been fully considered but they are not persuasive.

Applicant's arguments mainly pertain to the rejection of the first claim.

Applicant first argues that Larson et al. teaches geometric objects and not sets of data or data points, per se. In an attempt to explain their position, applicant argues:

--Larson et al. never uses the term "data." This is not persuasive because the term data does not need to be recited to fulfill the requirements of the instant claim. Data is any form of information (i.e. the coordinates of a rectangular solid in the first octant of three dimensional space).

--Claim 1 defines data points to have values and identities. This is not persuasive because the points representing the solid have values and identities.

--In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., see page 10 of the Remarks which cites a description of Figure 10 of the instant

specification) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

--Applicant argues, "The phrase 'data set,' in the scientific community, is used to refer to observations collected by experimental procedures." This argument is not persuasive for the reasons discussed above.

Likewise, applicant argues that specific claim language (i.e. "normalized data points," "order preserving sequences," "data points," "sequences") are not taught in Larson et al. This is not persuasive because explicit claim language is not necessarily required in the prior art. For example, the instant claims recite "data points ..in n-dimensional space" which corresponds to Larson's points which are distributed in three-dimensional space, as set forth in Figures 14.1 through 14.7 on pages 785-787. These data points are interpreted to be sequences of normalized data points.

Next, applicant argues on pages 13-14 that the rectangular solid does not follow the illustration of an order preserving sequence. This argument is not persuasive because applicant then calculates an order preserving sequence in a means inconsistent with the specification and Figure 11B of the drawings.

Applicant's arguments with respect to Schadt et al. have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

No claim is allowed.

Claims 2-3, 5-6, 8-11, 15-16, 18-19, 21-22, and 24-28 are free of the prior art for the following reasons.

Claims 2, 15, and 21 are free from the prior art, because while Larson et al. teaches the "shortest" order preserving sequence (i.e. the distance minimizing the Euclidean distance between points), the prior art does not show the "longest" order preserving sequences between data points.

Claims 3, 6, 16, 19, 22, and 25 are free of the prior art because the art does not teach weighting order preserving sequences and then summing these weights.

Claims 5, 6, 9, 18, 19, 24, 25, and 27 are free of the prior art because the art does not teach thresholds to associate with the order preserving sequences.

Claims 8-11 and 26 are free of the prior art because the art does not teach determining metrics of ordering preserving sequences by traversing in independent directions in multidimensional space.

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the central PTO Fax Center. The faxing of such pages must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993)(See 37 CFR § 1.6(d)). The Central PTO Fax Center Number is (571) 273-8300.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell Negin, Ph.D., whose telephone number is (571) 272-1083. The examiner can normally be reached on Monday-Friday from 7am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Marjorie Moran, Supervisory Patent Examiner, can be reached at (571) 272-0720.

Information regarding the status of the application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information on the PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/RSN/
28 April 2008

/Marjorie Moran/
Supervisory Patent Examiner, Art Unit 1631